

Name \_\_\_\_\_

## Unit 3.2 Exam – Part 1

AP Biology

2017 - 2018

This exam will be returned to you so be sure to annotate it while testing so you can understand any misconceptions when it is returned to you for review.

There are 11 multiple choice questions

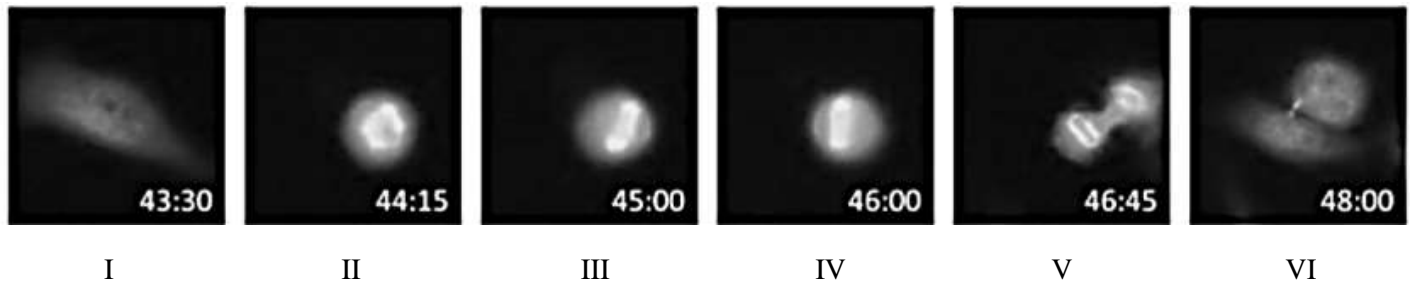
The exam must be completed within the class period

In a series of experiments, cells were measured numerous times over 48 hours for quantities of various substances as shown in the table below. Free cyclin represents the amount that is not bound to cdk forming the MPF complex.

Cell Classification	Free Cyclin	DNA Polymerase	MPF (Cyclin & cdk)
Cell A	0 ug	49 ug	278 ug
Cell B	68 ug	198 ug	20 ug
Cell C	23 ug	4 ug	65 ug

- Which description below best identifies and explains which cell in the table above is most likely to be cancerous?
  - Cell B because the high level of free cyclin indicates MPF is always being degraded, thus cell division never occurs.
  - Cell A because no free cyclin indicates that MPF is never being degraded, thus cell division never stops.
  - Cell C because the low level of DNA Polymerase indicates that DNA is constantly being degraded.
  - Cell B because the high level of DNA Polymerase indicates that cell division is always occurring.
- Which of the following is **NOT** a correct description of an event occurring in interphase?
  - M-Phase when cytokinesis occurs.
  - G1 Phase when normal protein synthesis would be occurring.
  - G2 Phase when organelles would be duplicated.
  - S Phase when diploid cells could become haploid cells.
- Which phase of the cell cycle contributes the **least** to natural selection in sexually reproducing eukaryotes?
  - Metaphase I of Meiosis
  - Prophase 1 of Meiosis
  - Telophase I of Meiosis
  - S phase of Meiosis or Mitosis
- An enzyme is introduced into a sample of plant & animal cells. Both cells experience errors during cytokinesis at the same rate. Which of the following is a logical explanation of the enzyme's action?
  - The enzyme interferes with the Golgi apparatus.
  - The enzyme interferes with kinetochore proteins.
  - The enzyme interferes with motor proteins.
  - The enzyme degrades cellulose.

The figures below show time-lapsed footage of an actively dividing cell in Meiosis I that will ultimately give rise to 4 gametes. The DNA was treated with a fluorescent dye that distinguishes between maternal and paternal DNA.



5. Which of the above cell(s) could best confirm this as a Meiosis I division?

- a. All cells could equally confirm this as a first meiotic division.
- b. Cells II & VI
- c. Cells III & IV
- d. Cells IV & V

6. Which of the above cells would best model the law of independent assortment?

- a. Cell II
- b. Cell III
- c. Cell V
- d. Only a cell in Meiosis II would model this law

7. Which description below is accurate about the genetic material of a cell in Metaphase of Meiosis I whose somatic cells contain 38 chromosomes?

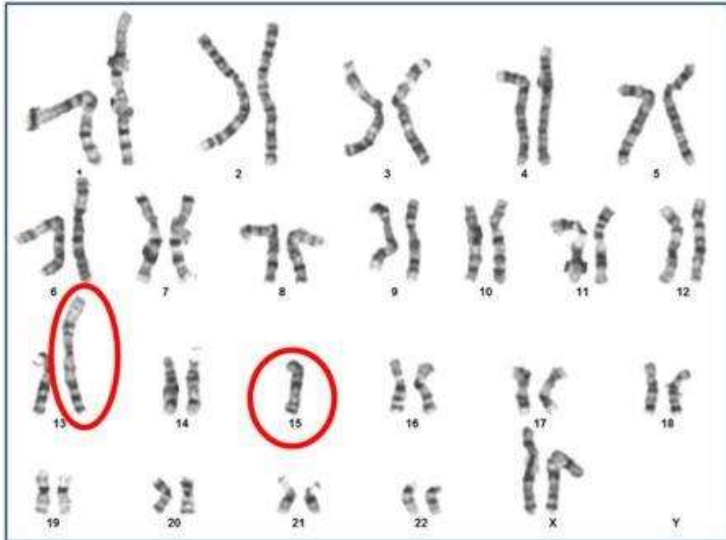
- a. A diploid cell with 19 pairs of homologous chromosomes
- b. A diploid cell with 38 pairs of homologous chromosomes
- c. A diploid cell with 19 chromosomes
- d. A haploid cell with 76 chromatids

8. In a family pedigree, the analysis of a genetic disorder shows that its effects are most commonly found in males. Which type of inheritance pattern would likely be the cause?

- a. Autosomal recessive inheritance
- b. Mitochondrial inheritance
- c. X-linked dominant inheritance
- d. X-linked recessive inheritance

9. In a typical dihybrid cross, which of the following could account for an unexpected result?

- a. The law of segregation
- b. Independent assortment
- c. Gene linkage
- d. The law of dominance



10. Which type of chromosomal mutation most likely resulted in the karyotype shown above?

- a. Translocation
- b. Inversion
- c. Deletion
- d. Nondisjunction

11. For the cross  $AabbX^hX^h \times AaBbXY$  what is the probability of a child who is homozygous recessive for both autosomal traits and does not have an affected phenotype for the sex-linked trait?

- a.  $1/32$
- b.  $1/8$
- c.  $3/32$
- d.  $1/16$

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Answer Grid:

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_ 5. \_\_\_\_\_ 6. \_\_\_\_\_

7. \_\_\_\_\_ 8. \_\_\_\_\_ 9. \_\_\_\_\_ 10. \_\_\_\_\_ 11. \_\_\_\_\_